

BY THE COMPTROLLER GENERAL

Report To The Congress

OF THE UNITED STATES

COMPLETED
ORIGINAL

U.S. Fast Breeder Reactor Program Needs Direction

The United States nuclear fast breeder reactor program

- is in a state of disarray,
- lacks direction, and
- costs hundreds of millions of dollars a year.

Because of the fast breeder development strategy now being followed, the United States may not be able to have a commercially available technology if and when it is needed.

The key to resolving these problems is a clear understanding and agreement between the Executive Branch and the Congress on the future role of nuclear energy in the United States' energy supply mix.



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COMPTROLLER GENERAL'S
REPORT TO THE CONGRESS

U.S BREEDER REACTOR
PROGRAM NEEDS DIRECTION

D I G E S T

For more than 3 years the administration and the Congress have been unable to agree on the future role of fast nuclear breeder reactors in the United States. The issue boils down to whether the United States wishes to rely on nuclear power as a long- or short-term energy supply source.

If a long-term future for nuclear power is desired or even if the future role of nuclear power is viewed as uncertain but a nuclear option is to be maintained, constructing and operating a fast breeder demonstration plant is needed. On the other hand, if nuclear power is seen as having only a short-term role, the need to continue the breeder program is eliminated.

ADMINISTRATION'S STRATEGY IS RISKY

The liquid metal fast breeder reactor (LMFBR) program was accorded top priority until 1977 when the current administration significantly stretched out the program's proposed commercialization date from 1986 to about the year 2020. The new policy was founded on

- concern that plutonium-based nuclear fuels may lead to international nuclear weapons proliferation;
- projections supporting a diminished need for commercial breeder reactors because of reduced electrical energy growth forecasts and more plentiful uranium resources to fuel conventional light water reactors;
- projections that LMFBRs would not become economically competitive for several decades;
- questions about the safety of LMFBRs; and
- the belief that the Clinch River Breeder Reactor was too small, too costly, and technically obsolete.

GAO believes this policy is based on uncertain data and not supported by the evidence.

- The current strategy will not necessarily enable this country to achieve its non-proliferation goals. (See p. 10.)
- The projections of the availability of uranium are uncertain. (See p. 13.)
- Unanticipated events, such as the loss of Persian Gulf oil or future constraints on domestic coal supply could increase the future demand for nuclear energy and the need for an early commercialization of breeder reactors. (See p. 18.)
- The ultimate economics of the LMFBR are difficult to accurately project. (See p. 21.)
- The LMFBR is no more or less safe than the current generation of light water reactors. (See p. 22.)

PROGRAM HAS NO DIRECTION

Regardless of the validity of the administration's contention that commercial LMFBRs will not be needed before the year 2020, the United States may not even be able to meet this date. The LMFBR program:

- Lacks a clear mission and focus resulting in a considerable waste of time and money. (See p. 23.)
- Does not include assurance that the requisite institutional conditions for commercializing the option--industrial capability and utility confidence--will be in place to allow for a smooth transition to this energy supply option if and when it is needed. (See p. 29.)

The disagreement that has characterized the fast breeder program, specifically the LMFBR, for the past 3 years has made planning and directing the program difficult for DOE.

Currently, the administration is not supporting any overall program plan that details an LMFBR development strategy although many have been proposed by DOE. After three decades and several billion dollars of research and development on this energy system, DOE officials were unable to provide GAO with an approved and generally accepted plan on how to secure the LMFBR option by the year 2020 even though they recognize the need to have such a plan.

The more immediate problem facing DOE, however, is the lack of a specific plant commitment that would serve to focus the LMFBR base technology research and development work being done at its laboratory and contractor facilities toward some definable and measurable end use. With the uncertainty surrounding the Clinch River plant and the lack of an administration commitment to any demonstration plant, the LMFBR program has become unstructured and program progress is becoming increasingly difficult to define and measure.

The Congress has continued funding the Clinch River plant every year since 1977, despite the administration's repeated attempts to kill the project. Even with continued funding, however, no work has begun on constructing the facility. Recent actions by the administration underscore its desire to kill the Clinch River project and to defer any commitment for a substitute plant. Specifically

- the fiscal year 1981 budget submitted to the Congress again calls for termination of the Clinch River plant;
- the Nuclear Regulatory Commission licensing staff that is necessary for the Clinch River project to move toward construction has been dispersed;
- the fiscal year 1981 budget is requesting that the Nuclear Regulatory Commission's LMFBR safety research program be terminated; a move that, according to the Commission,

could cost the LMFBR program about 10 years of development time if work is ever resumed; and

--a decision on whether to construct a substitute plant for the Clinch River facility, scheduled for March 1981, has not been supported in the administration's fiscal year 1981 budget request.

Thus, it is probable, that another year of indecision is facing the LMFBR program.

TERMINATION OF GAS-COOLED FAST
BREEDER REACTOR PROGRAM
IS PREMATURE

The gas-cooled fast breeder reactor and the light water breeder reactor programs are being carried out as backups to the LMFBR program. However, in fiscal year 1981 DOE is planning to terminate its participation in the gas-cooled fast breeder reactor program while continuing to fund the light water breeder reactor program. But, according to DOE officials, the light water breeder reactor program cannot be viewed as an alternative or backup to LMFBRs because its objective and purpose are different. Accordingly, the United States will be left with no real nuclear alternative to the LMFBR technology if unforeseen or unanticipated technical or institutional obstacles prevent it from becoming the Nation's primary nuclear energy supply system. DOE's withdrawal from participation in the technology development program will probably cause the collapse of the industrial infrastructure that has grown in support of the program and, consequently, the only nuclear alternative to the LMFBR program will be lost. (See p. 36.)

CONCLUSIONS

Over the past several years both the Congress and the administration have endorsed the need for maintaining a strong LMFBR program in this country. However, a strong LMFBR program includes constructing and operating a plant--

something which has not been done. Consequently, if this country wants to rely on nuclear power as a long-term energy source or even if it chooses only to preserve a future energy supply option for possible use if other energy technologies cannot carry the load, the information gathered by GAO supports the position that fast breeder technology should move forward to the construction and operation of a LMFBR demonstration plant. In fact, the Congress, by continuing its support over the last 3 years for constructing and operating a demonstration plant, appears to have chosen this path. In this regard, however, it should be noted that constructing and operating a LMFBR plant that would serve to demonstrate the viability of the technology should not be viewed as an irrevocable commitment to commercially deploy the technology. These can be and should be two distinct phases of the overall development process.

In contrast, however, the administration, by its rigid opposition to constructing any breeder plants, has chosen a different path. So, if the program is to move forward, GAO believes it is necessary that the circle of debate between Congress and the administration be broken and that a clear and firm commitment on the long-term role of nuclear power be made. Recognizing the administration's position on this matter, the only real alternative is for the Congress to shoulder this burden.

In addition, to the extent the Congress wants to rely on nuclear power as a long-term energy supply source or wants to maintain a long-term nuclear option, prudent management dictates that a backup technology be available for timely development in case the LMFBR program does not meet its objectives. The gas-cooled breeder program can provide this needed backup capability. Consequently, the program should continue at least until it reaches a decision point on whether to construct and operate a demonstration facility--now scheduled for about 1984.

RECOMMENDATIONS TO
THE CONGRESS

If Congress wishes to maintain a nuclear option or if it wishes to commit to nuclear power as a long-term energy source, GAO recommends that it require DOE to demonstrate the viability of the LMFBR technology by mandating the construction of a breeder reactor facility. However, in making this recommendation, GAO wants to emphasize that it is not necessarily advocating the completion of the Clinch River project as the only means of moving the program forward. The only resolution to the impasse may be to move ahead with a larger, more recently designed facility instead of the Clincher Project.

In GAO's opinion, the imposition of a plant commitment on DOE would help foster a more appropriate U.S. breeder reactor research, development and demonstration posture. As part of this mandate, however, the Congress may wish to make it clear that it is not adopting a policy that would encourage premature commercial breeder deployment in this country.

Further, a commitment to a long-term nuclear option should include continued support for the gas-cooled fast breeder reactor program since it is currently the only real nuclear alternative to the LMFBR technology. Accordingly, GAO recommends that Congress continue to fund the program at least until the program reaches a decision point on whether to construct and operate a demonstration facility. Such an approach is essential as a prudent management step in helping assure the timely success of this Nation's nuclear energy future.

On the other hand, if Congress cannot reach a resolution on whether to preserve the breeder option or if it does not wish to do so, GAO recommends that it consider terminating the breeder program.

To continue to fund the program at several hundred million dollars a year to keep the scientific and engineering teams together is hard to justify. GAO points out, however, that if the program is terminated it could cost many years of developmental time if the Congress later chooses to restart it. If this should occur, the only available alternative may be to purchase breeder reactors from some more advanced, foreign nation.

AGENCY COMMENTS

The Department of Energy provided written comments on this report. Essentially, they agree that for effective management and resource utilization, a central organizing principle and a schedule are desirable for the program. Moreover, the Department recognizes that there is now no national policy guidance on whether or when breeder reactors will need to be deployed. On the other hand, the Department states that it has developed a rational approach for the development of the technology, should a national policy dictate the need to do so. A summary of the Department's comments and GAO's evaluation of them is included in chapter 5 of the report. The complete text of the Department's comments is included as appendix I.

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ABBREVIATIONS

CRBR	Clinch River Breeder Reactor
DOE	Department of Energy
GAO	General Accounting Office
GCPR	Gas-Cooled Fast Breeder Reactor
INFCE	International Nuclear Fuel Cycle Evaluation
LMFBR	Liquid Metal Fast Breeder Reactor
LWBR	Light Water Breeder Reactor
LWR	Light Water Reactor
NASAP	Nonproliferation Alternative Systems Assessment Program
NRC	Nuclear Regulatory Commission